

Evaluation of a High Performance Direct Digital Imaging Plate

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A direct digital imaging plate made by Varian Imaging Products (Palo Alto, California) is undergoing evaluation for imaging performance in comparison with a conventional film screen system. This imaging device is configured for use in conventional radiographic imaging. It consists of a detector system with an active surface that is 20.3 cm by 25.4 cm connected by a cable to a computer which controls the electronics during acquisition, processing, and display. The detector system contains a conventional Gd₂O₂S screen coupled to an amorphous silicon (aSi) photodiode and switching array having 1536 by 1920 elements, yielding spatial resolution of better than 3.5 lp/mm with 12 bits of data. In operation images are available for viewing in less than a minute. Preliminary work imaging volunteers demonstrates that the performance of the system is generally comparable to film. More quantitative evaluation is ongoing and will be presented. Modulation transfer function (MTF) and noise power spectrum (NPS) will be measured leading to determination of detective quantum efficiency (DQE). MTF will be measured in two directions using a slit. NPS will be obtained by collecting flat field images at multiple exposures. From these measurements, DQE will be computed. Additionally, the dynamic range will be demonstrated as a function of input dose level.